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ABSTRACT

Designed to improve students' thinking, learning, and creative skills while they learn to program a microcomputer in BASIC programing language, this instructional manual for beginning learners provides a brief section of information for each new topic together with a sample program to enter, run on the computer, and observe; a suggested change to clarify the principle being taught, and a challenge requiring use of the new principles. Each chapter includes a review. Procedures for turning the computer on and off are explained, as well as the commands to RUN, PRINT, LIST, HOME, NEW, GOTO, CONT, and END; the syntax error message; line numbers; and the use of commas, semicolons, colons, and the RESET and CONTROL keys. Information on using a disk to save or load programs is provided, including booting the disk, and the commands CATALOG, LOAD, INIT (initializing a disk), SAVE, DELETE, and RENAME. An appendix describes how to save on and load from tape, and a reference list of commands and key functions is provided. Separate color coded project books for elementary, junior high, and high school/adult students are available for this manual. (Author/LMM)

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THINKING · LEARNING · CREATING

TLC

APPLE II®
PROGRAMMING
MANUAL

for Growing Minds

Volume 1

by Kathy Taitt

tion Resources

CREATIVE LEARNING ASSOCIATION, INC.
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CHAPTER 1: GETTING TURNED ON

INFORMATION

To Turn the Computer On:

1. Turn on the monitor or T.V. set.

2. Turn on the computer keyboard. The power switch is located in back on the left-hand side. At the top of your screen you should see APPLE II along with a blinking box called a cursor. It shows the spot on the screen where the computer is ready to print. (If a disk drive is attached, the cursor won't appear yet.)

3. If the red "in use" light is on, hold the [CTRL] key down and press the [RESET] key on your computer. The red light should go off, and the cursor should be at the bottom of the screen. (On some computers, you may not need to hold the [CTRL] key down while pressing [RESET] .)

4. You are now ready to begin programming. Before getting started, read the instructions for turning the computer off.

To Turn the Computer Off:

1. If you have been using a disk, wait until the red light is off and then remove the disk.

2. After the red light is off, turn the computer off.

3. Turn the monitor off.

INFORMATION

In this book, you will see ENTER/RUN/OBSERVE. In each of these sections will be a program within stars (*). Type each program line exactly as it is shown. Then after you type each line, press the [RETURN] key to enter it into the computer.

ENTER/RUN/OBSERVE

```
**************************************************
* 1Ø PRINT "HELLO"                               *
**************************************************
```

Press [RETURN] .

Type

```
**************************************************
* RUN                                            *
**************************************************
```

and press [RETURN] again.

If SYNTAX ERROR appears, you have made an error. Just type the line again correctly, and press [RETURN] .

CHANGE IT/RUN/OBSERVE

After you have entered and RUN the program, try this one. Remember to press RETURN .

```
**************************************************
*                                                *
* 3Ø PRINT "GOODBYE"                             *
*                                                *
**************************************************
```

Don't forget to RUN the program again.

INFORMATION

When you enter LIST, the computer shows you the program you have typed and entered into its memory.

ENTER/RUN/OBSERVE

```
**************************************************
* LIST                                           *
**************************************************
```

When you press RETURN , the computer follows the LIST command immediately.

Now RUN. Notice that LIST shows the line numbers and commands. RUN shows what happens when those commands are followed.

CHANGE IT/RUN/OBSERVE

Enter this change.

```
**************************************************
* 2Ø PRINT "NEW PROGRAMMER"                      *
**************************************************
```

Press RETURN .

LIST.

Now RUN.

CHANGE IT/RUN/OBSERVE

Enter this change.

```
**************************************************
*                                                *
* 3Ø PRINT "YOU ARE DOING VERY WELL."            *
*                                                *
**************************************************
```

RUN.

Now LIST.

CHALLENGE

Type line 1Ø again. This time, put your own favorite greeting between the quotation marks in line 1Ø instead of HELLO.

RUN your program and see what it does.

LIST it.

INFORMATION

A computer program is a list of commands for the computer to follow. These commands must be in order for the same thing to happen each time the program is run. To do this, give each command a number, called a line number. The computer follows the commands in numerical order.

ENTER/RUN/OBSERVE

```
10 PRINT "SHERLOCK HOLMES"
20 PRINT "221B BAKER STREET"
30 PRINT "LONDON, ENGLAND"
```

Hint: If you mistype a letter, use the backspace key, [←], to go back and erase your mistake. This only works if the line hasn't been entered yet! If you enter a line with a mistake in it, type the line again the correct way using the same line number.

CHANGE IT/RUN/OBSERVE

Now add this line to your program. Be sure to RUN to see what happens.

```
**********************************************
*                                            *
* 15 PRINT "LIVES AT:"                       *
*                                            *
**********************************************
```

LIST your program.

Even though you entered line 15 after line 3Ø, the computer puts it in numerical order. Experienced programmers number program lines by tens, (1Ø, 2Ø, 3Ø, 4Ø...), because then there will be plenty of room to go back later and put in lines.

CHANGE IT/RUN/OBSERVE

Now add this line.

```
**********************************************
*                                            *
*  5 HOME                                    *
*                                            *
**********************************************
```

HOME is a very handy command. It clears the screen and puts the cursor back in the home spot at the top left. Using HOME before you print something on the screen makes your program look much neater. LIST your program. Then RUN it.

CHALLENGE

Find out if HOME can also be used as a direct command (without a line number) like RUN and LIST.

ANOTHER CHALLENGE

Program the computer to print your name and address on the screen. RUN it. LIST it. After it has done this, make the computer print your phone number after your name and before your address.

After you have RUN it this way, add another program line so that your age is printed after your address. (You can lie a little here if you like!)

If you haven't already, add a command so that the screen is cleared before the information about you is printed on the screen.

Be sure to RUN your finished program.

INFORMATION

The command NEW erases programs that are in the computer's memory. NEW, like RUN, is a command that is a direct operation for the computer. Just type it and press [RETURN] . It doesn't need to be assigned a line number although you may wish to do so in some programs.

ENTER/RUN/OBSERVE

```
**************************************************
* NEW                                            *
*                                                *
**************************************************
```

When you enter RUN or LIST after entering the above line, your program should not appear on the screen because the program has been erased.

Try it! Turning the computer off has the same effect as NEW ... you lose your program!

From now on, erase your old program with NEW before typing a new program. Do you know why? If you don't, you could have some of the old program lines mixed in with your new program.

INFORMATION

To print a blank line, use the PRINT command with nothing after it. This is useful for adding space between lines.

ENTER/RUN/OBSERVE

```
10 HOME
20 PRINT
30 PRINT "SHERLOCK HOLMES"
40 PRINT
50 PRINT "WAS CREATED BY:"
60 PRINT
70 PRINT "SIR ARTHUR CONAN DOYLE"
```

CHANGE IT/RUN/OBSERVE

Add this line.

```
70 PRINT "     SIR ARTHUR CONAN DOYLE"
```

Spaces placed inside quotation marks will be printed as blank spaces on the screen, as in line 70 above. This is useful for spacing within a line.

CHANGE IT/RUN/OBSERVE

Type line 7Ø again with enough spaces to center it between the left and right edges of the screen when the program is RUN.

CHANGE IT/RUN/OBSERVE

Add a blank PRINT line 65 to increase the space between the second and third lines of the screen.

CHALLENGE

Enter NEW.

Create a program that will cause the computer to print a short, five-line news release about your favorite politician. The message can be good or bad! Have each line centered on the screen.

ANOTHER CHALLENGE

See if you can program your computer to reproduce the following on your screen:

C
O
M
APPLE
U
T
E
R

INFORMATION

The LIST command can also be used to LIST part of a program.

ENTER/RUN/OBSERVE

Enter this program.

```
10 HOME
20 PRINT "  C"
30 PRINT "  O"
40 PRINT "  M"
50 PRINT "  P"
60 PRINT "  U"
70 PRINT "  T"
80 PRINT "ARE"
90 PRINT "  R"
100 PRINT "  SWELL"
```

Try entering each command below (one at a time!) and observe what is printed each time.

```
LIST 10-40
```

```
LIST -60
```

```
LIST 30-
```

These are variations of the LIST command.

They'll come in very handy when you are working with listings of longer programs which won't fit on the screen at one time.

CHALLENGE

Command the computer to list the following lines:

1. Any one line of your program.
2. The entire program.
3. The last three lines of the program.
4. Every line except the last one.
5. Every line except the first one.
6. Any four lines in the middle of your program.

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INFORMATION

To remove one line from your program, type the line number and press RETURN .

ENTER/RUN/OBSERVE

```
**************************************************
* 8Ø                                             *
**************************************************
```

LIST.

RUN.

CHALLENGE

Remove the line that says SWELL.

INFORMATION

A comma (,) used along with a PRINT statement causes an item to be printed in the next of three preset zones. Notice that the comma is not within quotation marks.

ENTER/RUN/OBSERVE

```
10 PRINT "DOGS","DWARFS","MISC."
20 PRINT
30 PRINT "LASSIE","GRUMPY","E.T."
40 PRINT "SNOOPY",,"YODA"
50 PRINT ,,"DR. WHO"
```

CHANGE IT/RUN/OBSERVE

Change line 50 to include the name of your favorite character in the appropriate column.

CHANGE IT/RUN/OBSERVE

Type NEW and get rid of the program.

```
10 PRINT "CITY","STATE","ZIP"
20 PRINT
30 PRINT "BONEGAP","IL","62815"
40 PRINT "TOWAOC","CO","81334"
50 PRINT "YOAKUM","TX",77995
```

Notice that numbers don't have to be enclosed in quotation marks to be printed! What do you observe about the spacing?

CHALLENGE

How many columns can you create using the comma method?

ANOTHER CHALLENGE

Create a program that produces two columns of things. In the left column, print those things that are good for you. In the right column, print only those things that are bad for you!

REVIEW: Choose the command or key which will cause the function described below.

	FUNCTION
	This command causes something to be printed on the screen.
	Pressing this key enters information into the computer.
	Entering this causes the computer to follow the program in memory.
	This key moves the cursor to the left and erases anything the cursor passes over.
	This useful command clears the screen and places the cursor in the upper left-hand corner of the screen.
	Be careful! This command erases your program!
	This command will give you a listing of the program in the computer's memory.
	When used with PRINT, this causes the cursor to move to the next preset zone.

CHAPTER 2: GOTO, THE PROGRAMMER'S MERRY-GO-ROUND

INFORMATION

GOTO sends the computer directly to a program line. Always include a program line number after the GOTO command.

ENTER/RUN/OBSERVE

```
10 PRINT "YOU ARE BECOMING A GREAT PROGRAMMER!"
20 GOTO 10
```

When you want to stop the program, hold down the CTRL key while you press the RESET key.

For some computers, the RESET key alone will stop the program. A little experimenting will tell you if you need RESET alone or CTRL RESET to stop your program.

CHANGE IT/RUN/OBSERVE

Add line 5. Change line 20. Then RUN the program again.

```
 5 HOME
20 GOTO 5
```

Using HOME and GOTO together creates a flashing effect, as you've discovered.

LIST and try to understand what each line of this program does.

CHANGE IT/RUN/OBSERVE

Run your program again, but instead of using the [RESET] key to stop it this time, hold down the [CTRL] key and press the [C] key.

INFORMATION

The difference between [RESET] and [CTRL] [C] is that [CTRL] [C] tells you at which line number the program was stopped. Also, [RESET] will clear some of the memory locations you'll be creating in more complicated programs. For this reason, it is a good idea to get into the habit of using [CTRL] [C] to break the endless loops created by GOTO.

CHALLENGE

In a two- or three-line program, create your own endless loop using commas and the GOTO command. Try to obtain a pleasing design that includes letters, numbers, and symbols. Go all out, have fun! You will use this program on the next page, so do not destroy it when you are through!

INFORMATION

The command CONT makes a program continue (when possible) from the point at which it was stopped by [CTRL] [C] or [RESET] .

ENTER/RUN/OBSERVE

Run your program from the last challenge, then stop it using [CTRL] [C] . Now enter

```
CONT
```

and see what happens. CONT is another direct operation for the computer (Remember LIST, NEW, and RUN?) and doesn't need a line number.

ENTER/RUN/OBSERVE

```
10 HOME
20 PRINT X
30 X=X+1
40 GOTO 20
```

In line 20, the letter X is a variable. One is added to X every time the computer comes to line 30. Stop the program. Then start it again by

both the RUN and CONT methods. Observe the difference between these two commands.

LIST.

CHANGE IT/RUN/OBSERVE

```
30 X=X+2
```

CHANGE IT/RUN/OBSERVE

```
20 PRINT "X"
```

CHANGE IT/RUN/OBSERVE

Change your program so it looks like this.

```
10 HOME
20 PRINT "I AM NOW PRINTING #", X
30 X=X+1
40 GOTO 20
```

CHALLENGE

Change the line number following GOTO so that only one line of print at a time appears on the screen.

ANOTHER CHALLENGE

a) Create a program that will print the multiples of three in one column.

b) Change it so that it will print the multiples of five in one column.

c) Change it again so that the PRINT statement will cause the multiples of three to be in the first column and the multiples of five in the second column.

INFORMATION

The command END makes the computer stop running the program.

ENTER/RUN/OBSERVE

```
10 HOME
20 GOTO 70
30 PRINT "IS FEAR ITSELF."
40 END
50 PRINT "WE HAVE TO FEAR"
60 GOTO 30
70 PRINT "THE ONLY THING"
80 GOTO 50
```

CHANGE IT/RUN/OBSERVE

Delete line 40 from the program above by typing 40 and pressing RETURN.

```
40
```

LIST to see what happens.

Notice how easy it is to delete a line.

RUN and see the difference one command can make.

CHALLENGE

Create a program that will print a favorite saying or poem of yours, or one that you make up yourself. Use lots of GOTOs to mix the lines up in the listing.

REVIEW: Choose the command or key which will cause the function described below.

	FUNCTION
	This command sends the computer directly to another line in the program.
	Pressing these two keys at the same time will stop your program.
	These keys also stop your program. Any counters or other numbers that the program created will be cleared.
	Entering this command will often cause a program to continue running from the point at which it was stopped.
	At this command, your computer ends the program.

CHAPTER 3: PUT IT WHERE YOU WANT IT

INFORMATION

A semicolon (;) used along with a PRINT statement makes the cursor stay at the last place it printed. This is useful for continuing to print on the same line. The semicolon is NOT within quotation marks.

ENTER/RUN/OBSERVE

```
10 PRINT "STAY"
20 PRINT "PUT"
```

CHANGE IT/RUN/OBSERVE

Now retype line 10 so it looks like this:

```
10 PRINT "STAY";
```

ENTER/RUN/OBSERVE

```
10 HOME
20 PRINT "KATHY  ";
30 GOTO 20
```

Leave two spaces after Kathy.

CHANGE IT/RUN/OBSERVE

```
20 PRINT "KATHY        ";
```

Leave eight spaces after Kathy.

Notice what a big difference the number of spaces inside the quotation marks made!

CHALLENGE

Write a program that will print your name all over the screen. Then see if you can change it so that:

1. Your name is printed in wide diagonal stripes, as in the second program above.
2. Your name is printed in columns.
4. Each name is printed right after the last one with no spaces in between.
5. Any design of your choosing is printed.

ENTER/RUN/OBSERVE

```
10 HOME
20 PRINT X;"     ";X+1"     ";X+2;"     ";
X+3
```

CHANGE IT/RUN/OBSERVE

Type line 2Ø again. This time, leave out the semicolons.

CHANGE IT/RUN/OBSERVE

Change line 2Ø so it will print six numbers on one line.

CHANGE IT/RUN/OBSERVE

Add this line.

```
5Ø GOTO 2Ø
```

CHALLENGE

Create a program that will print words in four columns spaced evenly across the screen.

ANOTHER CHALLENGE

Create a program that will place in column one, three people you like; in column two, the amount of money you would lend them; in column three, the amount of money they would lend you (Remember, it's your program. Think big!) and in column four (YES FOUR!), what you would be tempted to buy with the money.

INFORMATION

By using a colon (:), you can put more than one command in a line.

ENTER/RUN/OBSERVE

```
10 HOME
20 PRINT "THIS LINE"
30 PRINT:PRINT:PRINT
40 PRINT "    IS REPEATED":GOTO 20
```

RUN. Then LIST.

CHANGE IT/RUN/OBSERVE

Combine the commands in lines 10 and 20.

LIST. Then RUN.

CHALLENGE

Can you get the whole program on line 10?

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ENTER/RUN/OBSERVE

```
 10 HOME
 20 PRINT " #######
 30 PRINT " # O O #
 40 PRINT " #  Ø  #####
 50 PRINT " ###-########
 70 HOME
 80 PRINT " #######
 90 PRINT " # . . #
100 PRINT " #  !  #
110 PRINT " ##---##
112 PRINT "   ###
114 PRINT "   ###
116 PRINT "   ###
118 PRINT "   ###
130 GOTO 10
```

CHANGE IT/RUN/OBSERVE

Add these lines and watch!

```
 60 FOR T=1 TO 20: NEXT T
120 FOR T=1 TO 20: NEXT T
```

CHANGE IT/RUN/OBSERVE

Now try this.

```
60 FOR T=1 TO 300: NEXT T
120 FOR T=1 TO 300: NEXT T
```

Can you see why these lines are called TIME DELAYS?

Notice the difference between using 20 and 300. Try other values.

CHALLENGE

Change the face to represent your self-portrait!

REVIEW: Choose the command or key which will cause the function described below.

	FUNCTION
	This is used with a PRINT statement to keep the cursor where the computer last printed.
	This is used to put more than one command on a line.

CHAPTER 4: USING A DISK TO SAVE OR LOAD PROGRAMS

INFORMATION

If one or more disk drives is attached to the APPLE computer, it will look to disk drive #1 for information each time the computer is turned on, even if NO DISK IS THERE!

TURN THE COMPUTER KEYBOARD OFF.
NOW TURN IT ON.

The drive which is lit is drive #1. Press [CTRL] [RESET].

NOW TURN THE COMPUTER KEYBOARD OFF. (You may leave the monitor turned on.)

Locate a disk labeled "DOS SYSTEM MASTER" or "DOS MASTER." Insert it into drive #1. Look at the picture below to see the proper way to insert the disk. It should slide in smoothly.

YOU ARE NOW GOING TO BOOT THE SYSTEM

1. With the computer OFF and the DOS MASTER inserted into drive #1, close the drive door carefully.
2. Turn the computer on, and notice the RED light of drive #1 come on. The computer is now getting information from the DOS MASTER. DOS stands for Disk Operating System.
3. Never insert or remove a disk while the RED light is on.
4. When the cursor appears on the screen, type:

```
**************************
*                        *
*  LIST                  *
*                        *
**************************
```

and press RETURN

Notice the program that has been loaded into the computer's memory. You have now BOOTED the system. It is ready to work with disks.

You must BOOT the computer each time you turn it on if you want to work with disks.

CHALLENGE

Be sure the RED light is off.

Remove the DOS MASTER. Now turn off your computer, and BOOT the system again. Observe carefully what is on the screen.

BONUS

Turn your computer off.

Try BOOTING the system with a blank disk in drive #1. Notice what happens. Observe the message on the screen.

Press [CTRL] and [RESET] to regain control.

INFORMATION

The APPLE DOS MASTER disk has several programs on it. You can see a list of these programs by asking for a CATALOG.

ENTER/RUN/OBSERVE

BOOT the system with the DOS MASTER in drive #1.

Type:

```
**************************
*                        *
*  CATALOG               *
*                        *
**************************
```

and press [RETURN] .

The names of the programs on the disk should be displayed on the screen.

The number before each program's name tells how many sectors on the disk were used to store the program. For a short program, this number will be small.

The letter before the number refers to the language in which that program was saved. For example:

A represents Applesoft.
I represents integer.
B is a machine language program.
T represents a data file.

Use CATALOG whenever you want to see what is stored on a disk.

Look at the last line on the screen and then press any key. Sometimes the CATALOG is too long to fit on one screen.

CHANGE IT/RUN/OBSERVE

If you have two disk drives, try this. When the RED light is off, remove the DOS MASTER. Insert the DOS MASTER into the second drive (Drive #2). Close the door.

a. Now type:

```
**********
* CATALOG *
**********
```

and press [RETURN] .

Notice which RED light comes on and what message appears on the screen.

b. Now type:

```
**********************
* CATALOG, D2        *
**********************
```

c. When the RED light goes off, remove the DOS MASTER and insert it into drive #1. Close the door. Now type:

```
**********************
* CATALOG            *
**********************
```
and press RETURN

Notice which RED light comes on.

Notice the message on the screen.

d. Now type:

```
**********************
* CATALOG, D1        *
**********************
```
and press RETURN

Notice what happens.

e. Now type:

```
**********************
* CATALOG            *
**********************
```
and press RETURN

Once the computer has been told to look at disk drive #2, it will continue to do so until it is told otherwise, or the computer is turned off.

CHALLENGE

Starting with the computer off, BOOT the system and display a CATALOG of the programs available on the DOS MASTER.

BONUS

Starting with the computer off, BOOT the system, but then move the DOS MASTER to the second drive. Display a CATALOG of the programs available on the DOS MASTER.

INFORMATION

Once programs have been stored on a disk, they can be LOADed into the computer's memory.

ENTER/RUN/OBSERVE

With the DOS MASTER BOOTED, select the name of a program that is preceded by an A from the CATALOG of the DOS MASTER. Ignore the A and the number that follows.

Type:

```
**********************************************
*                                            *
* LOAD name                                  *
*                                            *
**********************************************
```

Name is the *name* you selected from the CATALOG. Now press [RETURN]. You have LOADed the program from the disk into the memory of the computer.

Now LIST, then RUN.

CHALLENGE

LOAD, LIST, and RUN several programs from the DOS MASTER.

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INFORMATION

You can now BOOT the system and LOAD programs from a disk. You are now ready to learn how to prepare a blank disk for use with your computer so that you can SAVE programs that you create.

Before you can save anything on a blank disk, the disk must be INITialized. When you buy a blank disk at the store, it can be INITialized to work in several brands of computers. After it has been INITialized, it will only work in your computer or computers just like yours.

The command that does this is INIT.

ENTER/RUN/OBSERVE

1. BOOT up the system with the DOS MASTER.
2. Type:

```
**********
* NEW    *
**********
```

and press [RETURN] .

3. Type

```
**************
* 1Ø PRINT "HELLO" *
**************
```

and press [RETURN] .

4. Take the DOS MASTER out and return it to a safe place. Put a blank disk in its place in the drive.

5. Now type:

```
**************************************
*                                    *
* INIT HELLO                         *
*                                    *
**************************************
```

6. When the red "In Use" light goes off and the cursor reappears on the screen, the disk has been initialized. You can now save other programs on it.

Once the disk has been initialized, it will remain that way until it's erased.

DON'T FORGET! YOU MUST NEVER REMOVE OR INSERT A DISK WHILE THE RED "IN USE" LIGHT IS ON.

Before you can use any blank disk, it must be initialized for your computer! Remember this!

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(315) 423-3640

CHALLENGE

Turn off your computer and use the disk you have just INITialized to BOOT the system. DO NOT USE THE DOS MASTER! Does it work? Ask for a catalog.

INFORMATION

Once a disk has been INITialized, programs may be stored on it.

ENTER/RUN/OBSERVE

With your INITialized disk in drive #1 and the system BOOTED, type NEW, then enter the program below.

```
10 HOME
20 PRINT "THIS PROGRAM HAS BEEN"
30 FOR T=1 TO 5
40 PRINT "SAVED!"
50 NEXT T
```

Now LIST and RUN.

To SAVE this program onto the disk, type:

```
SAVE NAME
```

That's all there is to it. When the cursor appears back on the screen and the red "In Use" light goes off, the program has been SAVEd onto the disk.

Now erase your program from the computer's memory by typing:

```
**************************************************
*                                                *
*  NEW                                           *
*                                                *
**************************************************
```

NEW erases the program from the computer's memory but not from the disk. The program is still on the disk. Check this by typing:

```
**************************************************
*                                                *
*  CATALOG                                       *
*                                                *
**************************************************
```

CHANGE IT/RUN/OBSERVE

Now load the program NAME from the disk back into the computer. Type:

```
**************************************************
*                                                *
*  LOAD NAME                                     *
*                                                *
**************************************************
```

and press [RETURN] .

Try running your program. It should run exactly as before.

NOTE: Whenever you load a program from disk into the computer, the computer automatically erases any programs in its memory first, before it loads the new program.

That's all there is to loading and saving programs. Now that you know these two commands, SAVE and LOAD, use them to save good programs that you write.

CHALLENGE

Write two programs and save them both on the same disk. Give them two different names, each different from the one you used before (NAME). After they have been saved on disk, load first one, then the other back into the computer. Try running them to be sure they were saved and loaded correctly.

INFORMATION

When you want to erase a program stored on a disk, use DELETE. But be sure you DO want to erase it!

ENTER/RUN/OBSERVE

1. Write a short program and save it on disk under the name TEST.
2. Check to be sure the program is on the disk by entering:

```
**********************************
*  CATALOG                       *
**********************************
```

3. Now type:

```
**********************************
*  DELETE TEST                   *
**********************************
```

and press RETURN .

4. Ask for another catalog listing. The program TEST should no longer be on the disk.

DELETE is used to erase programs from disks.

NEW is used to erase the computer's memory.

Don't get these two commands confused!

INFORMATION

Sometimes you may want to change the name of a program that is stored on disk. The command RENAME gives a program on a disk a new name.

ENTER/RUN/OBSERVE

1. Write a short program and save it on disk under the name OLD.
2. Look at a listing of the programs on the disk to be sure it is there.
3. Type

```
**********************************
*                                *
* RENAME OLD, NEW                *
*                                *
**********************************
```

and press [RETURN] .

When you use the RENAME command, put the old program name first, followed by a comma, then the new program name.

4. Look at a listing of the programs on the disk again. The program OLD should have been renamed NEW.

CHALLENGE

1. Write any type of program that you want, using the commands you have learned in this volume.
2. Save the program on disk under the name FIRST.
3. Erase the program from memory, then load it back into the computer from the disk. Check to be sure that it runs properly.
4. Change the name of the program from FIRST to SECOND.
5. Look at a listing of the programs on the disk to be sure that a program named FIRST no longer exists, and that the program is now stored under the name SECOND.

Congratulations! You now have a very fast and easy way to save those programs you've been creating. You will find that disks are very useful to you as a programmer, and they will save you lots of time and effort in the future.

Take very good care of them. They do not like magnetic fields, heat, oil, bending, dust, having things placed on top of them, or any form of abuse. Protect them.

Soon you will have acquired many disks that all look very much alike. Now is the time to think about how you will label each disk. DO NOT write on the disk with a pencil or ball point pen. Prepare your label BEFORE sticking it on the disk. Your label should include at least:

1) Your initials or name
2) The computer it runs on
3) The date
4) Some identifying word or code
5) A sequential number

Examples:

KAT APPLE 64K
GAMES
12/25/82
#12

KAT
APPLE 48K
12/26/82
RECORDS
#16

REVIEW: Choose the command or key which will cause the function described below.

	FUNCTION
	This command must be used to prepare a new disk for use on your Apple computer.
	Use this to copy a program from the computer's memory onto a disk.
	Use this to put a program stored on a disk into the computer's memory.
	Entering this command gives you a listing of all the programs stored on a disk.
	This command is used to erase programs from a disk.
	You can change the name of programs stored on a disk by using this command.

APPENDIX

SAVE ON TAPE

INFORMATION

Whenever you turn your computer off, any programs in its memory are lost. However, there are two ways for you to save these programs: on cassette tapes and on magnetic disks.

The command to save a program on a cassette tape is SAVE.

ENTER/RUN/OBSERVE

Be sure that your cassette recorder is hooked up to the computer. Now follow these steps in the order given.

1. First, you must have a program to save. So if there isn't one in your computer's memory, write one now. Be sure that it runs properly.
2. Use a pencil to wind the plastic leader forward. When the exposed tape boundary is at the center, stop winding and put the tape in the recorder.

3. Type:

```
**************************
* SAVE                   *
**************************
```

4. Press [PLAY] and [RECORD] on the tape player.

5. Press [RETURN] on the computer.

6. After a little while, you will hear a beep from the computer. This means that all is going well.

7. After a while longer, the computer will beep again. This means that it has finished saving your program on tape. You also will see the cursor on the screen.

8. Stop the tape player. First rewind, then remove the tape. Label the tape immediately!

9. You now have a copy of your program that will last a long time--providing you treat the tape with care. This means keeping it away from heat, magnetic fields, food, water, etc. Use good common sense!

Save this tape because you will soon be learning how to load programs back into the computer.

At this point, you do not know for sure if your program has been saved or not.

LOAD FROM TAPE

INFORMATION

Programs that are on cassette tape can be put back into the computer. The command that does this is LOAD.

ENTER/RUN/OBSERVE

Follow these steps in the order given to load a tape into the computer.

1. Place the tape that you saved a program on earlier in the tape player. Make sure the tape is rewound.
2. Type:

```
**********
* LOAD   *
**********
```

3. Push [PLAY] on the tape player.
4. Press [RETURN] on the computer.
5. The first beep you hear means that the program is starting to load.
6. The second beep means the program has finished loading into the computer. Stop the recorder, rewind the tape, take it out, and store it in a safe place until you want to use it again.

7. Try running the program to be sure it loaded correctly.

> NOTE: Whenever you LOAD a program into the the computer, any old programs in its memory will be erased.

If an ERR message occurs, try the following:

1. Turn off the computer.
2. Turn the computer back on.
3. Notice the two wires that go from the tape recorder to the computer. Observe where they enter the tape recorder and mark the rear-most wire so you can easily recall which hole it belongs in.
4. Unplug both wires that connect the computer with the tape recorder.
5. Rewind the tape.
6. Press PLAY . Listen to the tape. When you hear a loud, high-pitched sound, stop the tape recorder.
7. Plug the wires back into the tape recorder.
8. Type:

```
**************************
* LOAD                   *
**************************
```

9. Push PLAY on the tape recorder.
10. Press RETURN on the computer.

If this still does not work, change the volume control setting on the tape recorder slightly, and start at step 1.

REFERENCE

←	The backspace key moves the cursor to the left and erases anything the cursor passes over.
:	By using the colon, you can put more than one command on a line.
,	The comma, along with PRINT can be used to print in columns.
CONT	Entering CONT after stopping a program will often cause the program to continue running from the point at which it was stopped.
CTRL C	Pressing these two keys at the same time will stop your program.
END	At this command, your computer ends the program.
GOTO	This command sends the computer directly to another line in the program.
HOME	This useful command clears the screen and places the cursor in the upper left-hand corner of the screen.
10,20,30,...	Line numbers must be given to every statement in a program.

REFERENCE (continued)

LIST	Entering LIST will give you a listing of the program in the computer's memory. There are several variations of this command.
LOAD	To copy a program from a cassette tape into the computer's memory, you use the LOAD command.
NEW	Be careful! This command erases the computer's memory. (Which means your program!)
PRINT	This command causes something to be printed on the screen.
RESET	This key stops your program. Any counters or other numbers that the program created will be cleared.
RETURN	Pressing this key enters information into the computer.
RUN	Entering RUN causes the computer to follow the program in memory.
SAVE	This is the command that you use to save a program from the computer's memory onto a cassette tape.

REFERENCE (continued)

;	Used with a PRINT statement, a semi-colon keeps the cursor at its current location.
DISK COMMANDS	FUNCTION
INIT	This command must be used to prepare a new disk for use on your Apple computer.
SAVE	Use SAVE to copy a program from the computer's memory onto a disk.
LOAD	Use LOAD to put a program stored on a disk into the computer's memory.
CATALOG	Entering this command gives you a listing of all the programs stored on a disk.
DELETE	This command is used to erase programs from a disk.
RENAME	You can change the name of a program stored on a disk by using RENAME.

CONGRATULATIONS!!!

You have finished the red instructional level of TLC FOR GROWING MINDS and have a working vocabulary of BASIC commands you can now use to command your microcomputer.

You are now ready to do the RED PROJECTS in the TLC Project Book, Volume I/II. These will help you gain experience using the commands you have already learned. You should NOT go on to Volume II(Orange) until you have finished the RED PROJECTS. After solving the RED PROJECTS, you will be confident of your skill and ready to start Volume II (Orange) of TLC FOR GROWING MINDS, which will help you learn even more commands.